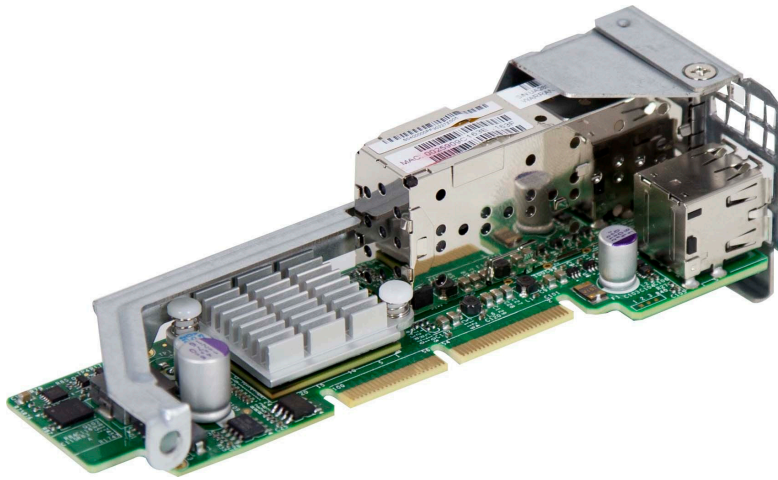
SUPER®

AOC-CTG-i2S



User's Guide

Revision 1.0

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User's Guide Revision 1.0

Release Date: September 21, 2012

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Preface

About this User's Guide

This user's guide is written for system integrators, PC technicians and knowledgeable PC users. It provides information for the installation and use of the AOC-CTG-i2S add-on card.

About this Add-on Card

The AOC-CTG-i2S 10 Gigabit Ethernet Adapter is a flexible and scalable Ethernet adapter designed for demanding data center environments. Based on Intel's 82599ES 10GbE network controller, the AOC-CTG-i2S addresses the demanding needs of next-generation data centers by providing virtualization features, LAN and SAN networking flexibility, and proven reliable performance. The AOC-CTG-i2S is designed in a small microLP form factor to fit within Supermicro MicroCloud and Twin server systems.

An Important Note to the User

All images and layouts shown in this user's guide are based upon the latest PCB Revision available at the time of publishing. The card you have received may or may not look exactly the same as the graphics shown in this user's guide.

Returning Merchandise for Service

A receipt or copy of your invoice marked with the date of purchase is required before any warranty service will be rendered. You can obtain service by calling your vendor for a Returned Merchandise Authorization (RMA) number. When returning the motherboard to the manufacturer, the RMA number should be prominently displayed on the outside of the shipping carton, and the shipping package is mailed prepaid or hand-carried. Shipping and handling charges will be applied for all orders that must be mailed when service is complete. For faster service, You can also request a RMA authorization online (http://www.supermicro.com).

This warranty only covers normal consumer use and does not cover damages incurred in shipping or from failure due to the alternation, misuse, abuse or improper maintenance of products.

During the warranty period, contact your distributor first for any product problems.

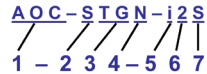
Conventions Used in the User's Guide

Pay special attention to the following symbols for proper system installation and to prevent damage to the system or injury to yourself:

Warning: Important information given to ensure proper system installation or to prevent damage to the components or injury to yourself.

Note: Additional information given to differentiate between various models or provides information for correct system setup.

Naming Convention



Character	Representation	Options
1st	Product Family	**AOC**: Add On Card
2nd	Form Factor	**U**: UIO, **S**: Standard, **P**: Proprietary, **C**: MicroLP
3rd	Product Type/Speed	**G**: GbE (1Gb/s), **TG**: 10GbE (10Gb/s) , **IBF**: IB FDR (56Gb/s) **IBQ**: IB QDR (40Gb/s), **INF**: InfiniBand DDR (20Gb/s)
4th	Chipset Model (Optional)	**N**: Niantec (82599ES), **P**: Powerville (i350)
5th	Chipset Manufacturer	**i**: Intel, **m**: Mellanox
6th	Number of Ports	**1:** 1 port, **2**: 2 ports, **4**: 4 ports
7th	Connector Type (Optional)	**S**: SFP+, **T**: 10GBase-T

SMC Networking Add-on Cards

Model	*Type*	*Form Factor*	*Interface*	*Controller*	*Connection*	*Dimension (without Brackets) (H x L)*
SG-i2	GbE	Standard LP	PCI-E x4	Intel® 82575EB	2 RJ45 (1Gb/port)	5.2" (13.2cm) x 2.5" (6.4cm)
SG-i4	GbE	Standard LP	PCI-E x8	Intel® 82576EB	4 RJ45 (1Gb/port)	5.8" (14.7cm) x 2.5" (6.4cm)
SGP-i4	GbE	Standard LP	PCI-E x4	Intel® i350	4 RJ45 (1Gb/port)	3.9" (9.9cm) x 2.5" (6.4cm)
STG-i2T	10GbE	Standard LP	PCI-E x8	Intel® X540	2 RJ45 (10Gb/port)	5.4" (13.7cm) x 2.5" (6.4cm)
STGN-i2S	10GbE	Standard LP	PCI-E x8	Intel® 82599ES	2 SFP+ (10Gb/port)	5.4" (13.7cm) x 2.5" (6.4cm)
STG-i2	10GbE	Standard LP	PCI-E x8	Intel® 82598EB	2 CX4 (10Gb/port)	5.6" (14.1cm) x 2.5" (6.4cm)
PG-i2+	GbE	Proprietary LP	PCI-E x4	Intel® 82576EB	2 RJ45 (1Gb/port)	3.8" (9.6cm) x 2.5" (6.4cm)
UG-i4	GbE	UIO FH	PCI-E x8	Intel® 82571EB	4 RJ45 (1Gb/port)	6.6" (16.7cm) x 3.9" (9.8cm)
UTG-i2	10GbE	UIO FH	PCI-E x8	Intel® 82598EB	2 CX4 (10Gb/port)	6.6" (16.7cm) x 3.9" (9.8cm)
UIBF-m1	FDR IB	UIO LP	PCI-E x8	Mellanox® ConnectX-3	1 QSFP (56Gb/port)	5.6" (14.0cm) x 2.5" (6.4cm)
UINF-m2	DDR IB	UIO LP	PCI-E x8	Mellanox® ConnectX-2	2 CX4 (20Gb/port)	5.5" (14.0cm) x 2.5" (6.4cm)
UIBQ-m1	QDR IB	UIO LP	PCI-E x8	Mellanox® ConnectX-2	1 QSFP (40Gb/port)	5.6" (14.3cm) x 2.5" (6.4cm)
UIBQ-m2	QDR IB	UIO LP	PCI-E x8	Mellanox® ConnectX-2	2 QSFP (40Gb/port)	5.6" (14.3cm) x 2.5" (6.4cm)
CGP-i2	GbE	MicroLP	PCI-E x4	Intel® i350	2 RJ45 (1Gb/port	4.5" (11.3cm) x 1.3" (3.4cm)
CG-i2	GbE	MicroLP	PCI-E x4	Intel® 82580	2 RJ45 (1Gb/port)	4.5" (11.3cm) x 1.3" (3.4cm)
CIBF-m1	FDR IB	MicroLP	PCI-E x8	Mellanox® ConnectX-3	1 QSFP (56Gb/port)	4.5" (11.3cm) x 1.3" (3.4cm)
CTG-i1S	10GbE	MicroLP	PCI-E x8	Intel® 82599EN	1 SFP+ (10Gb/port)	4.9" (12.3cm) x 1.5" (3.9cm)
CTG-i2S	10GbE	MicroLP	PCI-E x8	Intel® 82599ES	2 SFP+ (10Gb/port)	4.9" (12.3cm) x 1.5" (3.9cm)

Contacting Supermicro

Headquarters

Address:	Super Micro Computer, Inc.
	980 Rock Ave.
	San Jose, CA 95131 U.S.A.
Tel:	+1 (408) 503-8000
Fax:	+1 (408) 503-8008
Email:	marketing@supermicro.com (General Information)
	support@supermicro.com (Technical Support)
Website:	www.supermicro.com

Europe

Address:	Super Micro Computer B.V.
	Het Sterrenbeeld 28, 5215 ML
	's-Hertogenbosch, The Netherlands
Tel:	+31 (0) 73-6400390
Fax:	+31 (0) 73-6416525
Email:	sales@supermicro.nl (General Information)
	support@supermicro.nl (Technical Support)
	rma@supermicro.nl (Customer Support)

Asia-Pacific

Address:	Super Micro Computer, Inc.
	4F, No. 232-1, Liancheng Rd.
	Chung-Ho Dist., New Taipei City 235
	Taiwan, R.O.C.
Tel:	+886-(2) 8226-3990
Fax:	+886-(2) 8226-3991
Website:	www.supermicro.com.tw
Email:	support@supermicro.com.tw (Technical Support)
Tel:	+886-(2) 8226-5990 (Technical Support)

Table of Contents

Preface

Chapter 1 Overview

1-1 Overview 1-1
1-2 Key Features 1-1
1-3 Specifications 1-1

Chapter 2 Hardware Components

2-1 Add-On Card Image and Layout 2-1
2-2 Major Components 2-1
2-3 Connectors and LEDs 2-2
USB Ports 2-2
SFP+ Ports 2-2
SFP+ Port LEDs 2-2

Chapter 3 Installation

3-1 Static-Sensitive Devices 3-1
Precautions 3-1
Unpacking 3-1
3-2 Add-On Card Brackets 3-2
3-3 Before Installation 3-3
3-4 Installing the Add-on Card 3-3
3-5 Installing the Windows Operating System 3-4
3-6 Installing the Linux Operating System 3-4
Build a Binary RPM Package 3-4
3-7 Building the Driver Manually 3-5

Chapter 1

Overview

1-1 Overview

Congratulations on purchasing your add-on card from an acknowledged leader in the industry. Supermicro products are designed with the utmost attention to detail to provide you with the highest standards in quality and performance. For product support and updates, please refer to our website at http://www.supermicro.com/products/nfo/networking.cfm#adapter.

1-2 Key Features

The key features of this add-on card include the following:

- Dual SFP+ Connectors
- MicroLP form factor
- PCI Express 2.0 (up to 5GT/s)
- Intel® QuickData Technology
- VMDq, Next-Generation VMDq, and PC-SIG SR-IOV for Virtualized Environments
- Load Balancing on Multiple CPUs
- iSCSI Remote Boot Support
- Fibre Channel over Ethernet (FCoE) Support
- Support for most Network Operating Systems (NOS)
- Supports both DAC Twin Axial and LC Fiber-Optic SR Cables
- RoHS compliant 6/6

1-3 Specifications

General

- Intel® 82599ES 10GbE controller
- Compact size microLP form factor
- Dual SFP+ and dual USB 2.0 ports

- PCI-E 2.0 x8 (5GT/s)
- Load balancing on multiple CPUs
- iSCSI remote boot support
- Fibre Channel over Ethernet (FCoE) support
- Intel® PROSet Utility for Windows® Device Manager

I/O Features

- Intel QuickData Technology: DMA engine that enhances data acceleration and lowers CPU usage
- Direct Cache Access (DCA) to avoid cache misses
- MSI-X support to minimize the overhead of interrupts, allowing load-balancing between multiple cores/CPUs
- Tx/Rx IP, SCTP, TCP and UDP checksum offloading capabilities (IPv4, IPv6)
- Receive and transmit side scaling for Windows environments and scalable I/O for Linux environments

Virtualization Features

- Supports virtualization features such as VMDq, Next-Generation VMDq (64 queues per port) and PC-SIG SR-IOV implementation
- IPv6 Offloading
- Flexible Port Partitioning: 32 Virtual Functions
- Advanced packet filtering
- VLAN support to allow creation of multiple VLAN segments

Manageability Features

- Preboot eXecution Environment (PXE) support

- Simple Network Management Protocol (SNMP) and Remote Network Monitoring (RMON) statistics counters
- iSCSI remote boot

OS Support

- Windows® 7, 8, Server 2003, Server 2008, Server 2008 R2, Server 2012, Vista
- RedHat EL, SuSe SLES
- FreeBSD
- VMware

Cables Support

- SFP+ direct attached twin axial cables, up to 10 meters
- Dual LC fiber-optic SR cables, up to 300 meters (optional SFP+ transceiver is required)

Operating Conditions

- Operating temperature: 0°C to 55°C (32°F to 131°F)

Physical Dimensions

- Card PCB dimensions (without end brackets): 12.32cm (4.85in) x 3.9cm (1.54in) (L x W)

Optional Accessories

- AOC-E10GSFPSR: SFP+ transceiver module for short range fiber cables (up to 300m)
- AOC-TSR-FS: SFP+ transceiver module for short range fiber cables (up to 300m)
- CBL-0347L: 1m Twinax copper cable

- CBL-0348L: 3m Twinax copper cable
- CBL-0349L: 5m Twinax copper cable

Compliance/Environmental

- RoHS Compliant 6/6, Pb Free

Supported Platforms

- Supermicro Twin Server and MicroCloud Systems with microLP expansion slot (see table below)

		MicroLP Add-On Card				
Type	System	AOC-CG-i2	AOC-CGP-i2	AOC-CIBF-m1	AOC-CTG-i1S	AOC-CTG-i2S
Microcloud	5037MC-H8TRF	√ (1)				
	5037MR-H8TRF		√ (1)			
2U Twin²+	2027TR-H70RF+		√ (1)	√ (1)	√ (1)	√ (1)
	2027TR-H71RF+		√ (1)	√ (1)	√ (1)	√ (1)
	2027TR-HTRF+		√ (1)	√ (1)	√ (1)	√ (1)
	6027TR-H70RF+		√ (1)	√ (1)	√ (1)	√ (1)
	6027TR-H71RF+		√ (1)	√ (1)	√ (1)	√ (1)
	6027TR-HTRF+		√ (1)	√ (1)	√ (1)	√ (1)
2U Twin+	6027TR-D70RF+		√ (2)	√ (2)	√ (2)	√ (2)
	6027TR-D71RF+		√ (2)	√ (2)	√ (2)	√ (2)
	6027TR-DTRF+		√ (2)	√ (2)	√ (2)	√ (2)
	2027TR-D70RF+		√ (2)	√ (2)	√ (2)	√ (2)
Fat Twin (8 Nodes)	F617R2-R72+		√ (1)	√ (1)	√ (1)	√ (1)
	F617R2-RT+		√ (1)	√ (1)	√ (1)	√ (1)
Fat Twin (4 Nodes)	F627R3-R72B+		√ (2)	√ (2)	√ (2)	√ (2)
	F627R3-RTB+		√ (2)	√ (2)	√ (2)	√ (2)

(1) - 1U Bracket
(2) - 2U Bracket

Note1: This add-on card (AOC-CTG-i2S) is not recommended for 12-node MicroCloud systems.

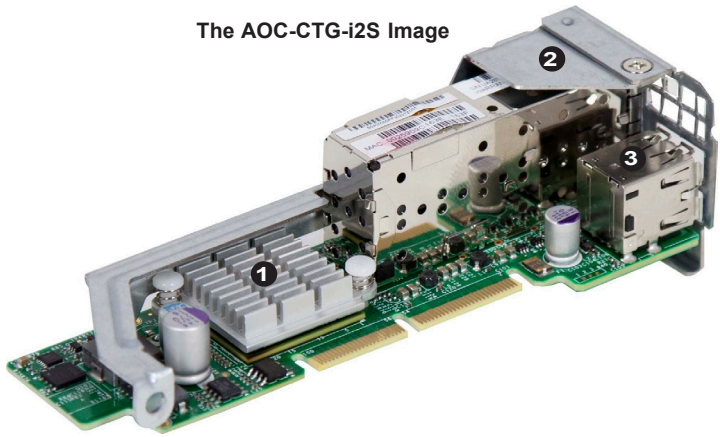
Note2: This product is only available to Supermicro OEM customers and is sold as an integrated solution with Supermicro server systems. For the most current product information, visit: www.supermicro.com.

Chapter 2

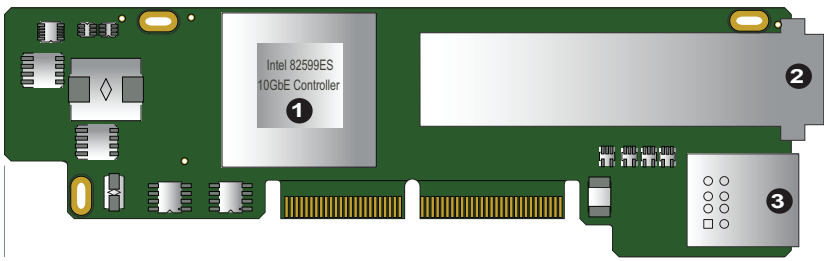
Hardware Components

2-1 Add-On Card Image and Layout

The AOC-CTG-i2S Image



The AOC-CTG-i2S Layout



2-2 Major Components

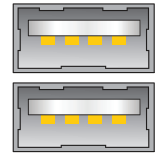
The following major components are installed on the AOC-CTG-i2S:

1. Intel 82599ES 10GbE Controller
2. Dual SFP+ Ports
3. Dual USB 2.0 Ports

2-3 Connectors and LEDs

USB Ports

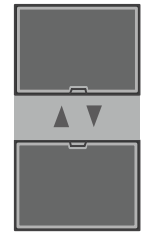
Two USB 2.0 ports are located on the add-on card. Refer to the add-on card layout on page 2-1 for the location of the USB ports.



SFP+ Ports

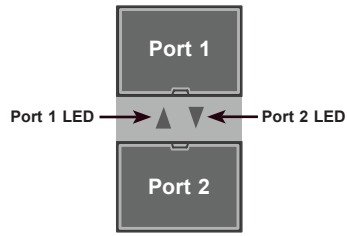
Two SFP+ 10GbE adapter ports are located on the add-on card. Connect a DAC Twin Axial cable or an LC Fiber-Optic SR cable to the ports to provide Gigabit Ethernet communication. Refer to the add-on card layout on Page 2-1 for the location of the SFP+ port.

Note: For MicroCloud systems, only Molex SFP+ Twinax copper cables are supported.



SFP+ Port LEDs

There are two triangular LEDs located between the dual SFP ports to indicate link speed and activity of each port (left LED is for Port 1, right LED is for Port 2). A 10Gb connection is indicated by a solid or blinking green LED. A 1Gb connection is indicated by a solid or blinking yellow LED. See the table at right for more information.



SFP+ Port LEDs		
LED	**Color**	**Definition**
Activity	Blinking Green	10Gb/s Activity
	Blinking Yellow	1Gb/s Activity
Link	Solid Green	10Gb/s Link Speed
	Solid Yellow	1Gb/s Link Speed

Chapter 3

Installation

3-1 Static-Sensitive Devices

Electrostatic Discharge (ESD) can damage electronic components. To avoid damaging your add-on card, it is important to handle it very carefully. The following measures are generally sufficient to protect your equipment from ESD.

Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing the add-on card from the antistatic bag.
- Handle the add-on card by its edges only; do not touch its components, or peripheral chips.
- Put the add-on card back into the antistatic bags when not in use.
- For grounding purposes, make sure that your system chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the add-on card.

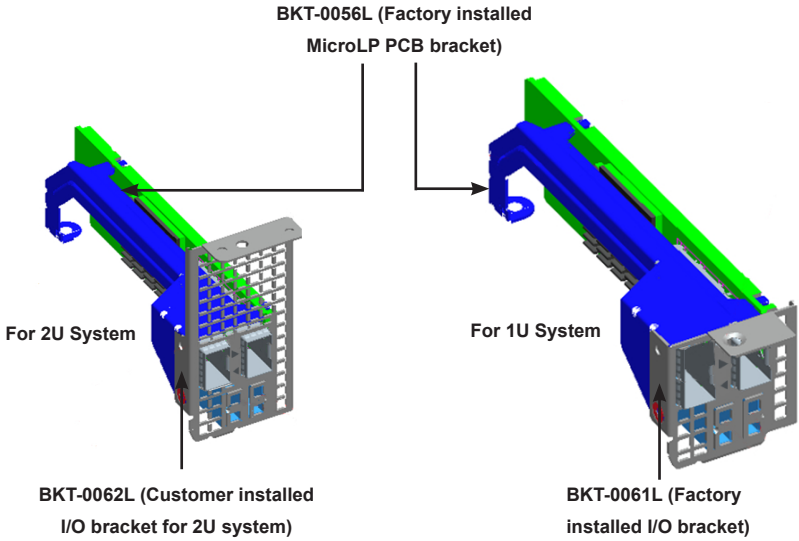
Unpacking

The add-on card is shipped in antistatic packaging to avoid static damage. When unpacking your component or your system, make sure that the person handling it is static protected.

Warning: To avoid damaging your components and to ensure proper installation, be sure to always connect the power cord last, and always remove it before adding, removing or changing any hardware components.

3-2 Add-On Card Brackets

The add-on card ships with a PCB bracket that is pre-installed at the factory. For 1U systems, an I/O bracket is also pre-installed on the card. For 2U systems, the I\O bracket is bundled with the card and must be installed by the customer. See the drawings below for bracket details.


BKT-0056L (Factory installed MicroLP PCB bracket)
For 2U System
For 1U System
BKT-0062L (Customer installed I/O bracket for 2U system)
BKT-0061L (Factory installed I/O bracket)

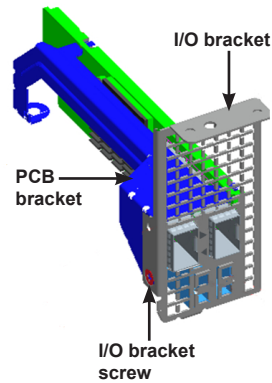
Note: For 2U systems, install the I/O bracket to the add-on card before installing the card inside the system.

Removing/Installing the IO Bracket

Refer to the illustration at right for the following instructions on removing/installing the I/O bracket.

To remove the I/O bracket: Loosen and remove the I/O bracket screw, then gently pull the bracket away from the add-on card.

To install the I/O bracket: Position the bracket so that the I/O cut-outs align with the connectors on the add-on card. Connect the I/O bracket to the add-on card, making sure that the screw hole in the PCB bracket and the I/O bracket are aligned. Secure the bracket to the add-on card using the I/O bracket screw.



3-3 Before Installation

To install the add-on card properly, be sure to follow the instructions below.

1. Power down the system.
2. Remove the power cord from the wall socket.
3. Use industry standard anti-static equipment (such as gloves or wrist strap) and follow the instructions listed on Page 3-1 to avoid damage caused by ESD.
4. Familiarize yourself with the server, motherboard, and/or chassis documentation.
5. Confirm that your operating system includes the latest updates and hotfixes.

3-4 Installing the Add-on Card

Follow the steps below to install the add-on card into your system.

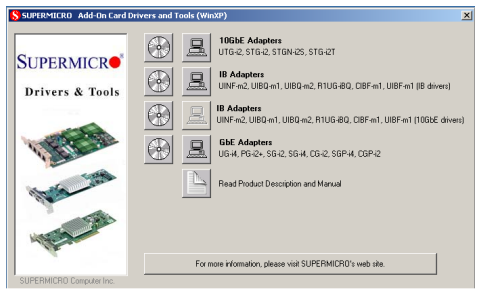
1. Remove the server cover and, if necessary, set aside any screws for later use.
2. Remove the add-on card slot cover. If the case requires a screw, place the screw aside for later use.
3. Position the add-on card in the slot directly over the connector, and gently push down on both sides of the card until it slides into the PCI connector.
4. Secure the add-on card to the chassis. If required, use the screw that you previously removed.
5. Attach any necessary external cables to the add-on card.
6. Replace the chassis cover.
7. Plug the power cord into the wall socket, and power up the system.

3-5 Installing the Windows Operating System

Follow the steps below to install the drivers needed for your Windows OS support. The controller comes with a driver on the CD-ROM CDR-NIC.

1. Run the CDR-NIC. (If you do not have a product CD-ROM, download drivers from the Supermicro Support Website and then transfer them to your system.)

2. When the SUPERMICRO window appears, click on the computer icon next to the product model.


SUPERMICRO Add-On Card Drivers and Tools (WinXP)
SUPERMICRO
Drivers & Tools
10GbE Adapters
UTG-i2, STG-i2, STGN-i2S, STG-i2T
IB Adapters
UINF-m2, UIBQ-m1, UIBQ-m2, R1UG-IBQ, CIBF-m1, UIBF-m1 (IB drivers)
IB Adapters
UINF-m2, UIBQ-m1, UIBQ-m2, R1UG-IBQ, CIBF-m1, UIBF-m1 (10GbE drivers)
GbE Adapters
UG-H4, PG-i2+, SG-i2, SG-H4, CG-i2, SGP-H4, CGP-i2
Read Product Description and Manual
For more information, please visit SUPERMICRO's web site.
SUPERMICRO Computer Inc.

Note: If the *FOUND NEW HARDWARE WIZARD* screen displays on your system, click CANCEL.

3. Click on INSTALL DRIVERS AND SOFTWARE.

4. Follow the prompts to complete the installation.

3-6 Installing the Linux Operating System

Follow the steps below to install the driver to a Linux system.

Build a Binary RPM Package

1. Run 'rpmbuild -tb <filename.tar.gz>'

2. Replace <filename.tar.gz> with the specific filename of the driver.

Note: For the build to work properly, the current running kernel MUST match the version and configuration of the installed kernel sources. If you have just recompiled the kernel, reboot the system at this time.

3-7 Building the Driver Manually

Follow the instructions below to build the driver manually.

1. Move the base driver tar file to the directory of your choice. For example

   ```
   /home/username/ixgbe
   ```

   or

   ```
   /usr/local/src/ixgbe
   ```

2. Untar/unzip archive, where <x.x.x> is the version number for the driver tar file:

   ```
   tar zxf ixgbe-x.x.x.tar.gz
   ```

3. Change to the driver src directory, where <x.x.x> is the version number for the driver tar:

   ```
   cd ixgbe-x.x.x/src/
   ```

4. Compile the driver module:

   ```
   make install
   ```

   The binary will be installed as:

   /lib/modules/[KERNEL_VERSION]/kernel/drivers/net/ixgbe/ixgbe.[k]o

   The install locations listed above are the default locations. They might not be correct for certain Linux distributions. For more information, see the ldistrib.txt file included in the driver tar.

   Note: IXGBE_NO_LRO is a compile time flag. The user can enable it at compile time to remove support for LRO from the driver. The flag is used by adding CFLAGS_EXTRA=-"DIXGBE_NO_LRO" to the make file when it's being compiled.

   make CFLAGS_EXTRA="-DIXGBE_NO_LRO" install

5. Load the module:

   For kernel 2.6.x, use the modprobe command:

   ```
   modprobe ixgbe <parameter>=<value>
   ```

For 2.6 kernels, the *insmod* command can be used if the full path to the driver module is specified. For example:

```
insmod /lib/modules/<KERNEL VERSION>/kernel/drivers/net/
ixgbe/ixgbe.ko
```

In addition, when using 2.6-based kernels, make sure that older ixgbe drivers are removed from the kernel before loading the new module. To do this, use:

```
rmmod ixgbe; modprobe ixgbe
```

6. Assign an IP address to the interface by entering the following, where x is the interface number:

```
ifconfig ethx <IP_address> netmask <netmask>
```

7. Verify that the interface works. Enter the following, where <IP_address> is the IP address for another machine on the same subnet as the interface that is being tested:

```
ping <IP_address>
```

(Disclaimer Continued)

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